



CHEETAL

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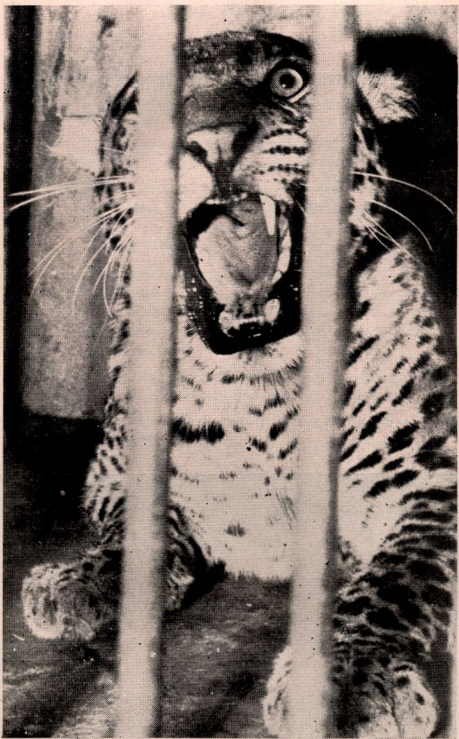
September, 1978

No. 1

Nanda Devi Sanctuary

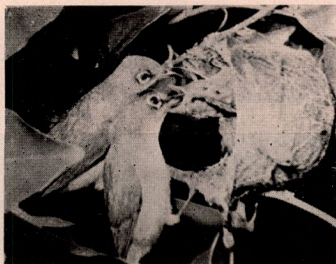
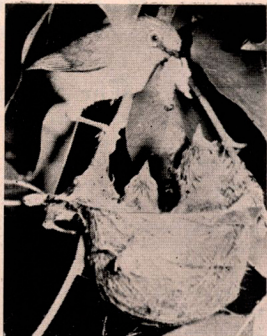
—Photo by Anup Shah





Pujari maneater.

(See Page 9)



White Eye—*Zosterops paepebrose*

Hindi name—Baboona

Both parents feeding the hatchlings at the same time. This is rather rare. Usually the parents feed alternately.

Photos by—S.P. Shahi

APPEAL

The Wildlife Preservation Society of India is purchasing the present office premises to have a permanent home.

Patrons, Members and Sympathisers are requested to donate generously to enable the society to complete the purchase.

Donations big and small may please be sent to the Wildlife Preservation Society of India, 7, Astley Hall, Dehra Dun, U.P. (India). All donations will be gratefully acknowledged and the names of donors published in Cheetal.

The Society has secured exemption under section 80 (G) of Income Tax Act and, therefore, donors will get a suitable concession in Income Tax.

Executive Committee

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Members and Subscribers are requested to note that all yearly subscriptions fall due on 1st of April each year. They are requested to pay in time so that Cheetal may be sent to them regularly.

Change of address should be intimated at the earliest to prevent Cheetal being lost in transit.

Honorary Secretary.

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CHEETAL

Journal of the Wildlife Preservation Society of India

Vol. XX

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No. 1

International Symposium on Tiger

An International Symposium on Tiger is to be held at New Delhi by the Government of India in February 1979 – (21-23) to focus attention on conservation of the Indian Tiger. More than two hundred delegates Indian and Foreign are expected to participate.

All Field Directors of Tiger Project areas in India will be submitting papers.

All interested in the Symposium may contact the Director, Project Tiger, Ministry of Agriculture, Government of India, New Delhi.

New light is expected to be thrown on the biology and behaviour of Indian Tiger and management of Project Tiger areas and a consensus is expected to be evolved on methods for saving our National animal from extinction.

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Shri Ashish Chandola a young and knowledgeable member, on a Wild Life film making trip to Shri Lanka writes:—

“We have had exceptionally good luck with filming here, and just the other day got a key sequence of a leopard attacking 4 full grown wild boar with 8 little piglets. Three of the adults, on seeing the leopard in full charge, formed a defensive barrier for the piglets by standing shoulder to shoulder, and met the leopard head on. The leopard crashed into the adults, who gave it a tremendous battering by throwing the leopard in the air, biting its tail, and just rolling it like a drum in front of a bulldozer. The leopard finally jumped in the air, took a quick turn and headed for the nearest tree. While all this was going on the fourth pig quietly took the piglets into nearest cover. All this happened on open flat ground at 10 a.m.”

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New YORK'S estimated 715,000 licensed big game hunters enjoyed more than 3.5 million man-days of recreation during the 1977 big game hunting season. The deer taken during the season reflect both fulfillment of hunter effort and successful management of the state's deer populations. The total take was 83,204 deer, lower than the 1976 take of 90,215. There were 27,324 antlerless deer taken in 1977, a decrease of 8,012 from 1976.

In India deer shot in a year are rarely recorded correctly and even figures recorded are not easily available.

With better management this renewable wildlife resource could provide recreation and venison to the hunters and revenue to the Government which would go a long way in conserving wildlife and environment.

* * *

The Meghalaya Government proposes to convert the Balphakharam region, including seven square kilometer flat plato in Garo Hills District into a Wild Life Sanctuary.

A study by Dr. A.K. Ghose and S. Biswas of the Zoological Survey of India indicates that nearly fifty percent of the animals known in the Indian subcontinent could be found in Meghalaya. The regional fauna though primarily Indo Chinese in origin had a variable admixture of peninsular, Ethiopian and other elements which had resulted in the complex assemblage. The area has a rich bird life.

* * *

The Zoological Gardens, Lucknow received a pair of Golden pheasants as a gift from the Peking Zoo in 1959. The Pheasants survived and bred. But, of the seventeen golden pheasants in the Zoo at the moment most are diseased with turned toes and twisted necks. Dr. Dawar Hussain Deputy Director of the Zoo thinks that it is due to too much close in breeding. If remedial steps are not taken the Zoo may be without golden pheasants.

Some Observations on Periods of Receptivity and Gestation in two Species of Great Cats in Captivity

By

L.N. ACHARJYO¹ AND S. MOHAPATRA²

It is essential to have a sound knowledge of all aspects of reproduction for the successful planning of breeding programmes in Zoological Parks. Almost all the Zoological Parks maintain some species of great cats and hence a knowledge of their breeding habits including the period of receptivity and gestation is considered necessary for their propagation and well-being. Available literature does not reveal much on this subject about tigers and panthers from India. Therefore some notes on periods of receptivity (period of mating) and gestation of tiger (*Panthera tigris*) and Panther (*Panthera pardus*) observed at the Nandankanan Biological Park, Orissa, during the period from January, 1970 to August, 1977 are presented here and the observations of earlier workers have been cited.

The observed period of mating is taken as the period of receptivity. The duration of gestation is estimated as the period from the last date of mating to birth.

Observations and Discussion

1. TIGER (*Panthera Tigris*)

The details of periods of receptivity and gestation observed in eight cases among three tigresses of the Park are given in the Table-1.

From this table it can be seen that the period of receptivity in tigress varies from 4 to 6 days with an average of 5.9 days and the gestation period varies from 98 to 104 days with an average of 101.13 days

The gestation period of this species is about 113 days (Asbell, 1964). According to Prater (1971) the gestation period is said to be 15 to 16 weeks. The receptivity in tigress continues for about 5 days and the gestation period from last observed mating are given as 100 to 108 days (Crandall, 1965). The gestation period is about 100 days (Chaturvedi, 1970). Sher Jung states that a tigress generally comes to season from February to May and remains in that interesting condition for about ten days and the gestation period is about fourteen weeks. Scott (1964) reports the gestation period of this species as 15 weeks. Acharjyo (1970) has given the gestation period of one tigress observed twice as 104 and 100 days respectively.

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Table I.

Sl. No.	Name of the tigress	Period of mating observed (period of receptivity)	Date on which the litter was born	Gestation Period in days (from last day of mating to birth)
1	2	3	4	5
1.	Tigress "Sikha"	26.12.1970 to 31.12.1970 (6 days)	10.4.1971	100 days
2.	Tigress "Sikha"	2.9.1972 to 5.9.1972 (4 days)	14.12.1972	100 days
3.	Tigress "Rani"	23.7.1971 to 27.7.1971 (5 days)	7.11.1971	103 days
4.	Tigress "Rani"	18.12.1971 to 23.12.1971 (6 days)	2.4.1972	101 days
5.	Tigress "Rani"	7.3.1973 to 12.3.1973 (6 days)	22.6.1973	102 days
6.	Tigress "Rani"	20.11.1974 to 25.11.1974 (6 days)	9.3.1975	104 days

1	2	3	4	5
7.	Tigress "Rani"	3.2.1977 to 10.2.1977 (8 days)	22.5.1977	101 days
8.	Tigress "Rekha".	9.1.1977 to 14.1.1977 (6 days)	22.4.1977	98 days

2. PANTHER (*Panthera Pardus*)

The details of period of receptivity and gestation observed in nineteen cases among six Pantheresses of the Park are given in the Table—II.

A study of this table reveals that the period of receptivity in Pantheress varies from 4 to 8 days with an average of 5.6 days. The gestation period varies from 89 days with an average of 94.74 days.

The gestation period of this species is about 3 months (Asdell, *loc. cit.*; Scott, *loc. cit.*); 98 to 105 days (Kenneth, 1953); 13 weeks (Prater, *loc. cit.*); and about 90 to 100 days (Chaturvedi, 1969). The gestation period of the genus *Panthera* is given as 92 to 113 days (Walker *et. al.*; 1964). The range of oestrus among nine adult Pantheresses of Delhi Zoological Park are given as 4 to 14 days and the gestation periods (from last day of mating to birth) are given as 84 to 98 days with a mean of 91.9 days (Desai, 1975). Pocock (1939) reports a gestation period of 102 days for an African leopard at Whipsnade Park Zoo. Crandall, (*loc. cit.*) gives the gestation period for a Black Panther 90 days from the middle of mating span. 112 days is recorded as gestation period at Prague Zoo (Dobroruka, 1968). Sablier (1966) reports the gestation period of 100 days for two litters of the Chinese leopard from the second day of oestrus.

Table II.

Sl. No.	Name of the Pantheress	Period of mating observed (period of receptivity)	Date on which litter was born	Gestation period in days (from last day of mating to birth)
1	2	3	4	5
1.	Pantheress "Sundari"	19.3.1970 to 22.2.1970 (4 days)	31.5.1970	98 days

1	2	3	4	5
2.	Pantheress "Sundari"	24.4.1971 to 28.4.1971 (5 days)	3.8.1971	97 days
3.	Pantheress "Sundari"	14.10.1972 to 20.10.1972 (7 days)	26.1.1973	92 days
4.	Pantheress "Sundari"	23.2.1974 to 2.3.1974 (8 days)	5.6.1974	95 days
5.	Pantheress "Sundari"	7.3.1976 to 13.3.1976 (7 days)	13.6.1976	92 days
6.	Pantheress "Rupa"	26.7.1970 to 31.7.1970 (6 days)	2.11.1970	94 days
7.	Pantheress "Rupa"	20.1.1972 to 24.1.1972 (5 days)	22.4.1972	89 days
8.	Pantheress "Rupa"	13.12.1974 to 20.12.1974 (8 days)	26.3.1975	96 days

1	2	3	4	5
9.	Pantheress "Rupa"	28.5.1976 to 2.6.1976 (6 days)	6.9.1976	96 days
10.	Pantheress "Rupa"	9.11.1976 to 14.11.1976 (6 days)	16.2.1977	94 days
11.	Pantheress "Spotty"	15.10.1970 to 18.10.1970 (4 days)	20.1.1970	94 days
12.	Pantheress "Spotty"	11.3.1972 to 16.3.1972 (6 days)	18.6.1972	94 days
13.	Pantheress "Spotty"	16.4.1973 to 21.4.1973 (6 days)	23.7.1973	93 days
14.	Pantheress "Spotty"	13.11.1974 to 18.11.1974 (6 days)	23.2.1975	97 days
15.	Pantheress "Spotty"	14.2.1974 to 18.2.1976 (5 days)	23.5.1976	95 days

1	2	3	4	8
16.	Pantheress "Shanti's"	29.3.1975 to 1.4.1975 (4 days)	7.7.1975	97 days
17.	Pantheress "Lata"	4.7.1976 to 7.7.1976 (4 days)	13.10.1976	98 days
18.	Pantheress "Shanti"	29.1.1977 to 2.2.1977 (5 days)	8.5.1977 and 9.5.1977	95 days
19.	Pantheress "Kumari"	24.5.1977 to 28.5.1977 (5 days)	30.8.1977	94 days

Summary

The period of receptivity and gestation in eight cases among three tigresses and in nineteen cases among six pantheresses were observed during the period from January, 1970 to August, 1970 at the Nandankauan Biological Park, Orissa. The observed period of mating is taken as the period of receptivity and the gestation period is estimated as the period from the last day of mating to birth.

The period of receptivity in tigers varies from 4 to 6 days with an average of 5.9 days and the gestation period in this species varies from 98 to 104 days with an average of 101.13 days. In pantheress, the period of receptivity varies from 4 to 8 days with an average of 5.6 days and the gestation period varies from 89 to 98 days with an average of 94.74 days.

Acknowledgement

The authors express their gratitude to Shri S.N. Das I.F.S., Chief Conservator of Forests, Orissa, Cuttack and to Shri G.M. Das, I.F.S., Chief Wild Life Warden, Orissa, Bhubaneswar for their encouragement.

The Untold Story of the Pujari Maneater

By

S. P. SHAHI

Chief Conservator of Forests (Retired) HEHAL, Ranchi.

Now that the Pujari Maneater has been trapped alive a post-mortem of events from the night of January 22, 1977 when he made his first kill till his capture 14 months later is necessary. This may help avoid mistakes, should another reign of terror be unleashed by a new maneating leopard, as it must, in Pauri Garhwal.

Pauri Garhwal is a picture of closely shaved denuded hills with most of its steep slopes converted into terraced agricultural fields. This land of Jim Corbett lost its forest cover several decades ago and with it all the herbivorous fauna—food for tigers and leopards. When a forest eco-system is destroyed, prey-animals (chital, sambar, wildboar etc.) predecease the predators. Tigers and leopards linger on to feed on domestic cattle and then on humans till the last one either dies of hunger or is killed. And, between a tiger and a leopard, the bigger cousin loses the survival battle first. The leopard is hardier more cunning, and lurks near human habitations amidst bare rocks in descending darkness in villages.

This is the ecology of Pauri Garhwal and before the last leopard dies (the tiger has become extinct already) more maneaters will make newspaper headlines. Even then peace and prosperity will not descend on the 'Garhwalis'. The inexorable law of nature will continue to operate. With no forests, the hills will continue to erode, the soil in the field will be further impoverished and the poor marginal farmer will become poorer. The lesson is: forest-cover must be restored.

Within a month of the leopard claiming a nine-year-old girl as his first victim in Mohan Pujari village, he attacked an elderly lady of about 45, but could not kill. It was yet too early for the villagers to be terrorised. It was the maneater's second attempt on a human. In inaccessible Pauri there was none to examine her injury and to be able to understand why the leopard attacked but could not kill. It was only when the brute began to deliver fatal blows, one after another, not only upon cows buffaloes and goats but on women and children with ominous regularity that the peaceful environment of Pauri changed into one of panic and nightmare. In his anxiety to rid the villagers of the scourge, District Magistrate T. George Joseph distributed sixteen guns to villagers without ascertaining, whether they had the ability to identify the killer and were marksmen of such calibre to be able to shoot within the twinkling of an eye in the darkness of the night. The guns proved to be of no avail. Either a child or a young woman continued to be felled and another mauled every month besides several head of cattle destroyed in a row in each single attack.

As killings continued, the pattern became clear. The maneater preferred only children and light-weight young women whom he could hurl down the hill. He never dragged any of his victims up the slope; it appeared he was physically unfit to do so. Heavy cattle which he could not push down, were abandoned at site after hurried bites at their soft neck regions.

The District Magistrate's anxiety was understandable. He did not, however, realise that dealing with humans was an altogether different kettle of fish from tackling a maneating leopard. Cleverer than the tiger and more fierce than the lion, a leopard is reputed for its adroitness and fineness in killing its prey. A great care was therefore required in selecting shikaris to whom permits to destroy the maneater could be issued. Ignorant of a leopard's ways, the worried D.M. made it free-for-all. Any one could try and kill the maneater. This was doomed to fail. The leopard continued to claim one victim after another while guns boomed in the night and shikaris in jeeps with spotlights honeycombed the territory for the elusive maneater. An example of the ludicrous extent to which the campaign was allowed to drift were the pranks of some who tried to lure the leopard by playing taped voices of women and children inside dummies of human figures. The tiger and the leopard have been admired since Corbett's days for their stealth, sense of hearing sight and intelligence. Those who depended on tapes seemed to be unaware of these attributes the killer possessed.

In this horde of picnickers masquerading as shikaris was one who could not even distinguish between the stripes of a hyena and rosettes of a leopard. And, when he shot the hyena, a pregnant one at that he thought he was on top of the world. Newspapers flashed the maneater's death. No hyena, which is essentially a scavenger and usually goes after the offal, was ever so honoured.

There was, however, a silver lining to the otherwise dismal confusion in the maneater's domain. A couple of experienced shikaris outside the bunch of revellers went after the Pujari in a business-like manner. Aziz Imam was one of them. Imam decided, he must first identify the animal to avoid shooting the innocent ones by examining the pattern of injury on mauled human victims and slain cattle.

In his letter of 24th March 1977 to the Wildlife Warden at Kotdwar (the nearest wildlife administrator), Imam wrote "yesterday when we visited the site of the cow killed at village Gonkhilla (where a human killing took place on the 11th inst.) I pointed out to you that from the marks on the dead cow's throat it appeared that the leopard had only one sound canine." He further suggested "if any leopard is killed you may consider bearing in mind the above point in order to assess whether the animal is actually the maneater or not". Two months later on 25th May 1977, a 20-year-old youth was seized by the knee while asleep. He was too big to be hurled down the hill, so he escaped. When others came to his

rescue, Imam had the opportunity to examine his knee-injury. He informed the Chief Wildlife Warden, Lucknow on 2nd June 1977...“the attack on 25th May came to my notice only when I visited the area yesterday to investigate an attack on a bullock, which again shows the broken teeth marks of the maneater. It seems to me that the broken teeth are the two lower canines.” After examining many pug marks he had also informed the authorities that the animal was “a big male of around seven feet.”

Forest authorities insisted that only Imam-type shikaris should operate in the area and that too on permits issued by the Chief Wildlife Warden. Law provided that he was the only competent official to authorise hunters; not the District Magistrate. D.M.; Joseph who had sworn that he would not shave off his beard till the maneater was killed, was in no mood to listen. Did he expect his pious resolve would somehow reach the ears of the defiant beast who would then surrender in his court? Bad blood between the district and forestry personnel reached such a peak that in a public meeting the D.M. threatened to arrest Asok Singh, Director Lucknow Zoo and a member of the Indian Forest Service along with his men if they did not stop moving in the affected area.

In such an atmosphere there was none to prevent indiscriminate shooting. No one saw to it that hunters concentrated on one particular animal—the maneater. As feared three other leopards were killed within a period of fifteen days in February 1978, though by this time the handicap of the maneater had become known and he could easily be identified by the nature of dental marks he left on his victims. Predictably the ‘Pujari maneater’ continued to kill and maul. Urmilla (23) with a child in her womb and Vidya, another 15-year girl, became the maneater’s victims. No shikari ever caught a glimpse of the maneater, he had become so wary.

Exasperated at the state of affairs, Imam, in a lengthy telegram to the Union Minister of Agriculture (the ministry that looks after forests at the Centre) said among other things “Subject Maneating Leopard Pujari Garhwal Uttar Pradesh. Wildlife Protection Act 1972 requires maneaters be hunted under permit by Chief Wildlife Warden. District Magistrate Pauri has taken law in his own hands. Three leopards, one pregnant hyena, not maneaters, killed with connivance of District Magistrate who has warned Wildlife Warden Kotdwara not to take action. District Magistrate aims at eliminating all leopards of the area though competent hunters can identify and hunt the maneater.”

N.D. Jayal, Joint Secretary, while forwarding this telegram to Uttar Pradesh Government advised “we do hope that whatever steps the State Government is taking to eliminate the maneater are strictly covered under the provisions of the Wildlife Protection Act 1972 and that unnecessary slaughter of wild animals by unauthorised hunters will not be authorised by the district administration.”

Ultimately V.B. Singh, the Chief Wildlife Warden of Uttar Pradesh, unmindful of the District Magistrate's threat to arrest Forestry personnel, planned to capture the Pujari alive. He had successfully trapped two cattle-lifting leopards earlier. With the assistance of Bharat Singh, local MLA who knew this area of his constituency very well. V.B. Singh selected a spot on Gohar Nala below a bridge that connected villages on both sides. A cunning maneater on his prowl moves along paths that provide maximum hiding facilities. The spot selected was ideal from this point of view. The Pauri maneater had to pass underneath this bridge on his round, some day, to hunt in villages on the other bank. And, in an iron cage, very thoughtfully fabricated, long enough to permit a goat (as bait) and the whole length of a leopard but not too wide and high to cause injury to the captive in his violent attempts to break open the cage when trapped, the maneater of Pauri Garhwal was lured into (on 7th April 1978) at the sound of the bleating goat, within a fortnight after the cage was positioned underneath the bridge.

I photographed the 'maneater' three weeks later in Lucknow Zoo. Each time I pointed the camera at him he would lunge viciously, snarling at me, only to be stopped by the thick iron bars. In the process he always revealed his lone upper canine and the broken stumps of the two lower ones. How accurately Imam's description tallies with the beast captured ! (see photograph). There is no shadow of doubt that Pauri maneater has been trapped.

While in wilderness 'Pujari' seemed a phantom; as a prisoner he is a puzzle to his wardens. How did he lose his three canines ? There are no bullet injury marks, other teeth and the lips are perfect. This would not have been the case if someone had a shot at him. Second only to the canines, a cat's claws are his most useful armour. He fastens his prey with them while tearing the flesh. All claws are missing. They have dropped out of their sockets clean. No one knows, how.

In retrospect, one wishes there was better understanding between the district administration and forest authorities. Scant regard by generalists of technical men's views in Government hierarchy has too often bedevilled public cause. Agony of Pujari inhabitants would have been much shortened and some lives saved, had the Chief Wildlife Warden been left to use his expertise with all the resources of the District Magistrate placed at his disposal.

There will be more maneating leopards in Pujari. Absence of natural prey-animals makes me predict this. Also the trigger-happy men currently let loose in the area may have wounded innocent leopards who might turn maneaters. One can only hope lessons will have been learnt from the Pujari episode when a second catastrophe grips Pauri Garhwal.

Ticks and Our Vanishing Wildlife

By

B.D. SHARMA

Department of Zoology, T.H. D.S.B. College, Kumaon University, Nainital (U.P.)

The wildlife is the only entity which represents the true and intimate relationship between ticks and their natural preferred hosts in nature. The loss incurred due to tick infestation of many species of wild animals (including both big and small game) is enormous and often goes un-noticed and little understood because of the remote and inaccessible ecological pockets inhabited by their various hosts in wild. A severe infestation not only causes disease indirectly but may directly kill the host. Besides, the anaemic and exsanguinate conditions cause general debility in host animals. The hosts also are victimized by the fatal pathogenic organisms causing disease transmitted by ticks.

Considerable loss to the population of deer and moose in Canada is accountable to the tick *Dermacenter albipictus* (Gregson, 1956). Rabbits (both domestic and wild) are also indiscriminately killed by the severe infestation of ticks (Jellison and Kohls, 1935). Gregson (1952, 1953) described the loss in life of white mice due to *Dermacenter andersoni* (adults); and in deer due to the ear tick *Otobius megnini*. It is remarkable that the ear tick *Otobius megnini* is known to cause deafness in hosts on account of its heavy infestation deep in the ear. Such conditions are also greatly responsible for reducing the population of wild hosts such as deer and other cervines in an environment abounding with predators especially of cat family.

The ticks vectors of *Tuleraemia* infest numerous game birds and mammals and thus bring about the periodic fluctuations in the population structure of these essential elements of wild life (Brown, 1944).

The following are some of the important species of ticks occurring in India and abroad and infesting a variety of wildlife hosts in natural conditions:

FAMILY: IXODIDAE

1. *Amblyomma americanum* (wild rodent, wild carnivore and wild birds)
2. *A. maculatum* (wild birds and wild rodents)
3. *A. cajennense* (wild carnivores)
4. *A. tuberculatum* (cottontail rabbits and wild birds)
5. *A. inornatum* (hares and cottontail rabbits)
6. *A. variegatum* (wild birds, wild rodents and lagomorphs)
7. *A. hebraeum* (wild birds, small mammals and baboons)
8. *Boophilus decoloratus* (wild ungulates)

9. *B. annulatus* (cervine hosts i.ee *Axis axis*)
10. *Dermacenter variabilis* (deer, mice, voles, cottontail rice rats, other wild rodents, cottontail rabbits and wild carnivores).
11. *D. andersoni* (small carnivores, lagomorphs and wild rodents)
12. *D. marginatus* (wild rodents, small carnivores and lagomorph)
13. *D. pictus* (*D. reticulatus*) (wild rodents, lagomorphs and small carnivores)
14. *D. occidentalis* (deer mice, wood rats, other wild rodents cottontail rabbits and hares)
15. *D. parumapertus* (cottontail rabbits, hares and other small mammals)
16. *D. albipictus* (deer and moose)
17. *D. nuttalli* (small carnivores, lagomorphs and wild rodents)
18. *D. silvarum* (small carnivores, lagomorphs and wild rodents)
19. *Haemaphysalis nadchatrami* (wild rodents)
20. *H. semermis* (wild rodents)
21. *H. spinigers* (wild rodents, bonnet monkeys and langurs)
22. *H. leachii* (wild rodents and other carnivores)
23. *H. houyi* (ground squirrels i.e. *Euxeres*)
24. *H. concinna* (wild rodents small mammals and birds)
25. *H. punctata* (rabbits, hedgehogs and wild rodents)
26. *H. leporispalustris* (hares and rabbits)
27. *Hyalomma impelatum* (wild rodents and hares)
28. *H. truncatum* (wild birds, wild rodents and lagomorphs)
29. *H. marginatum rufipes* (wild rodents and hares)
30. *H. marginatum marginatum* (wild rodents and hares)
31. *Ixodes rubicundus* (wild lagomorphs and wild carnivores)
32. *I. pilosus* (wild mammals)
33. *I. canisuga* (wild mammals)
34. *I. canisuga* (wild mammals)
35. *I. hexagonus* (hedgehogs and wild carnivores)
36. *I. persulcatus* (wild rodents and wild carnivores)
37. *I. spinipalpis* (wild lagomorphs)
38. *I. dentatus* (cottontail rabbits)
39. *I. kingi* (wild rodents, wild carnivores and lagomorphs)
40. *I. angustus* (voles, deer mice, other wild rodents, lagomorphs and wild carnivores)
41. *I. rugosus* (wild rodents)
42. *I. cookei* (wild rodents and wild carnivores)
43. *I. pacificus* (lagomorphs, wild rodents and wild ungulates)
44. *I. muris* (voles deer, mice, other rodents and cottontail rabbit)
45. *I. ricinus* (wild rodents, wild carnivores and lagomorphs)

FAMILY: *ARGASIDAE*

46. *Ornithodoros moubata* complex (wild rodents and lagomorphs)
47. *O. turicata* (wild rodents and lagomorphs)
48. *O. parkeri* (wild rodents and lagomorphs)
49. *O. talaje* (simian primates and wild rodents)
50. *Otobius megnini* (hares, wild ungulates and cottontail rabbits)
51. *O. lagophilus* (hares and cottontail rabbits)

The following is the list of the diseases for which the wild animals act as reservoir and transmit them to other animals and man through various species of ticks and other haematophagous arthropods.

1. Tick-borne typhus fevers
2. Encephalitides and related virus infection (arthropod-borne)
3. Rabies
4. Murine typhus
5. Psittacosis (Ornithosis)
6. Wasselsbron fever
7. Rift valley fever
8. Encephalomyocarditis
9. Lymphocytic chorio-meningitis
10. Plague
11. Yellow fever
12. Q. fever
13. Tsutsugamushi fever
14. Leptospiroses
15. Rickettsialpox
16. Relapsing fever
17. Salmonellosis
18. Tularaemia
19. Rat-bite fever
20. Pseudotuberculosis
21. Ixoplasmosis
22. Leishmaniasis-Kala-azar, espundia and oriental sore
23. Trypanosomiasis (African and South American)
24. Myiasis
25. Ectoparasitic implications (ticks, mites, bugs, fleas, and fleas)
26. Trichonosis
27. Hydated disease
28. Hymenolepis infestation
29. Strongyloides infestation
30. Fasiolopsis infestation
31. Schistosomiasis (far Eastern)
32. Myiasis.

The ticks therefore, play a notable role in impairing the wildlife population to a great extent. A bulk of our vanishing wild life can certainly be preserved, if intensive investigations are carried out in different parts of the world on vector ticks of wild animals. These studies are important because the ticks victimized the wildlife hosts fatally by a complex and unique operation of micro pathogens of various groups viz. Protozoa, Rickettsia, Bacteria and Virus, etc., harboured and transmitted by one host, two host and three host tick species.

The investigation will however, also give a solution to many other problems of ecological and epidemiological interest related to ticks and their practical wild hosts in nature and causing serious hazards to wildlife and human population practically all over the world.

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Preservation and Welfare of Wildlife in India

By

S.K. Roy

Pressure of population on the wildlife habitat is so over-whelming that despite many constructive developments in recent years the future welfare of wildlife seems rather grim. Yet in this as in so many other spheres the contradictions on the Indian scene hold out some hope of success. India's rural population—about 500 million strong, has, with few exceptions a remarkable ability to relate to nature and to wildlife. There are many groups who are not only vegetarian, but actively eschew all killing. At one Jain shrine perched on a high, heavily-forested hill, the priests and acolytes periodically drive away animals rather than harm them. In forest areas, the locals learn to co-exist easily with all carnivora, except those which with wounds or old age have turned into man-eaters.

This is very much part of the Indian ethos at the grass roots level, going back to earliest times. An awareness of the oneness of man and nature is recorded in the very first writings of the race. A movingly beautiful description of the creation of woman in a mythological tale probably contemporary with Vedic verses composed about 3500 years ago goes as follows:

'The great Artificer took the rotundity of the moon, and the curves of creepers, and the clinging of tendrils, and the trembling of grass, and the slenderness of the reed, and the bloom of flowers, and the lightness of leaves, and the tapering of the elephant's trunk, and the glances of deer, and the clustering of rows of bees, and the joyous gaiety of sunbeams and the weeping of clouds, and the fickleness of the winds, and the timidity of the hare, and the vanity of the peacock, and the softness of the parrot's bosom, and the hardness of adamant, and the sweetness of honey, and the cruelty of the tiger, and the warm glow of fire and the coldness of snow, and the chattering of jays, and the cooing of the cuckoo, and the hypocrisy of the crane, and the fidelity of the Brahmany duck, and compounding all these together, he made woman, and gave her to man.'

An incident in the Sariska game sanctuary near Alwar, just south of Delhi, charmingly illustrates the relationship between man and nature. A few years ago game viewing just after first light, a friend and I saw a tiger loping slowly down the side of the main road through the sanctuary. We followed it for about half a mile, stopping only because much further down the road on the same side as the tiger there were two milkmen on bicycles on the way to market with their cans of morning milk. They were coming towards the tiger; and we feared for them. As the tiger ambled on, the milkmen got off their cycles and quietly crossed the road to give the tiger ample room to pass. After it had gone on a little

way and then disappeared off into the jungle, the cyclists remounted and moved on towards us. Out of an overwhelming curiosity, we stopped them to ask why they han't been afraid—as they seemed so totally unworried. One promptly said "Oh no sir. That tiger was in deep thought."

The depredations since Moghul times from the hunting by the rulers, first Indian then British, makes it difficult to conceive that barely two hundred years ago the Indian lion and the great Indian rhinoceros once spread all over the country. But at Independence in 1947, tigers and leopards and a wide variety of mammals and birds were still so vastly numerous that we in India tended to take the natural abundance of our wildlife for granted, and overlooked the consequences of the atavistic ardour of the sportsman, the pot hunters, and the poachers. In the middle fifties there were still herds of black buck more than a thousand strong. Numerous tigers and other big game species still roamed more or less freely in large areas of protected forest all over the land. By the sixties the deer herds had disappeared, the cheetah was extinct, and the tiger and many other species already endangered.

The plight of the wild was the result of the dramatic changes taking place in the countryside. The agricultural revolution resulted in the clearing of hitherto neglected areas earlier not considered cultivable. Forests declined before the demands of the burgeoning population. The sub Himalayan region previously protected by the malaria mosquito became fit for human habitation—people and prosperous farms displaced the animals. Cultivators tilled their lands gun in hand for protection agaist tigèrs and elephants, and to augment food supplies.

The voices of a few dedicated conservationists finally began to be heard over the fusillade from miscellaneous firearms, and in 1952 the Indian Board for Wildlife was set up by the union government to co-ordinate wildlife preservation at the national level. Institutional non-governmental involvement was limited to the Bombay Natural History society, with inspiring support from Dr. Salim Ali the world renowned ornithologist and author. The obvious need for a conservation-oriented organisation resulted in the emergence in 1958 of the Wildlife Preservation Society of India which despite financial limitations produces a quarterly wildlife journal 'Cheetal', thanks to the selfless efforts of its Honorary Secretary Dr. Misra.

More recently the World Wildlife Fund through Prince Bernhard and a group of wealthy influential Indians established W.W.F. India. The international organisation after an impressive global fund-raising programme to save the tiger donated US \$ 1,000,000 for "Project Tiger" in India, which with substantial additional Government funds is being used to establish eleven key sanctuaries to regenerate the species.

Much excellent work has been done, and there are reports about increases in the number of tigers, but it is still too early to say whether this can effectively counter the continued decrease of some two-thirds of the tigers now outside the sanctuaries, or whether in the years to come tigers will be limited to a few specially protected areas as is the Indian lion and the great one-horned rhinoceros. The central and state governments are certainly making a major concerted effort but these organisational measures depend for real success on public participation, which is still a long way from being achieved. Fortunately there is much greater public awareness. Air India, always in the van of progress, gives interesting proof of this. It has most imaginatively constituted an ecology committee.

The crisis of Indian wildlife reflects a global trend. It is readily understandable in India as there is apparently an intrinsic conflict of interest between the needs of our steadily increasing population, with vociferous demands, and votes to back them, and the voiceless, voteless animals of the wild. Many international experts consider there is little we can do to halt this tragic trend. The distinguished ecologist-naturalist S. Dillon Ripley, Secretary of the Smithsonian Institution says: "What those of us interested in conservation are virtually sure of is that many of the species of plants and animals, finely-tuned to their surroundings, especially in the tropics, will vanish from the scene long before we have managed to create ways to stabilise the juggernaut of humanity." His acknowledged expertise and lifetime field interest in South Asian fauna and flora make his view authoritative.

With limited credentials for doing so, I venture to suggest that in India despite our overwhelming problems, we can do better if only we can build a proper bridge of understanding between our rural population and the urban conservation authorities. As a passionate conservationist, with more than a little contact with our people at the field level, I think we can build on measures taken independently, by local villagers without any official encouragement, to protect all species in the vicinity of their villages—creating multiple mini sanctuaries. Modern conservation methods with an organised system of careful restocking of badly depleted areas has worked elsewhere, and can certainly be repeated in our country. It is no coincidence that the earliest recorded official ordinance on conservation was probably the Emperor Ashoka's pillar edict about 300 B.C., requiring protection of certain animals including the rhinoceros, and preservation of our forests.

Much has happened to our peoples and our land over the centuries but the doctrine of "ahimsa" (non-violence) is still very real for the majority of our people. Its application in a unique, long-drawn-out, bitter fight for freedom by Mahatma Gandhi has made it part of our contemporary life. I refuse to believe that in our ancient land, the land of the Buddha, the Jain saints, and of Gandhiji, our people will deny to the birds and animals and plants and fishes of our forests and plains, and from our skies and our rivers, a reasonable right to co-existence.

Fauna of Corbett National Park

(Continued from Cheetal, Vol. XIX, No. 4, June 1978)

By B.S. LAMBA AND R.K. BHATNAGAR

230. *Harpactes erythrocephalus hodgsonii* (Gould) : Nepal Redheaded Trogen.
Order : Coraciiformes
Family : Alcedinidae : Kingfishers
231. *Ceryle lugubris continentalis* Hartret : West Himalayan Pied Kingfisher.
232. *Ceryle rudis leucomelanura* Reichenbach : Indian Pied Kingfisher.
233. *Alcedo atthis pallasii* Reichenbach : Central Asian Small Blue Kingfisher.
234. *Alcedo atthis bengalensis* Gmelin : Indian Small Blue Kingfisher.
235. *Pelargopsis capensis capensis* (Linnaeus) : Brownheaded Storkbilled Kingfisher.
236. *Halcyon smyrnensis fusca* (Boddaert) : Indian Whitebreasted Kingfisher.
Family : Meropidae : Bee-Eaters
237. *Merops leschenaulti leschenaulti* Vieillot : Chestnutheaded Bee-Eater.
238. *Merops philippinus philippinus* Linnaeus : Bluetailed Bee-Eater.
239. *Merops orientalis orientalis* Latham : Indian Small Green Bee-Eater.
240. *Nyctyornis athertoni athertoni* (Jardine & Selby) : Blue bearded Bee-Eater.
Family : Coraciidae : Rollers or Blue Jays
241. *Coracias benghalensis benghalensis* (Linnaeus) : Northern Roller or Blue Jay.
242. *Eurystomus orientalis cyanicollis* Vieillot : Himalayan Broadbilled Roller.
Family : Upupidae : Hoopoes
243. *Upupa epops epops* Linnaeus : European Hoopoe.
244. *Upupa epops ceylonensis* Reichenbach : Ceylon Hoopoe.
Family : Bucerotidae : Hornbills
245. *Tockus birostris* (Scopoli) : Grey Hornbill.
246. *Aceros nipalensis* (Hodgson) : Rufousnecked Hornbill.
247. *Anthracoceros malabaricus malabaricus* (Gmelin) : Indian Pied Hornbill.
248. *Buceros bicornis homrai* Hodgson : Great Pied Hornbill.
Order : Piciformes
Family : Capitonidae : Barbets
249. *Megalaima virens marshallorum* Swinhoe : Himalayan Great Barbet.

277. *Mirafra javanica cantillans* Blyth : Singing Bush Lark.
 278. *Eremopterix grisea* (Scopoli) : Ashycrowned Finch-Lark.
 279. *Calandrella cinerea dukhunensis* (Sykes) : Rufous Short-toed Lark.
 280. *Calandrella acutirostris acutirostris* Hume : Humes Short-toed Lark.
 281. *Galerida cristata chendoola* (Franklin) : Indian Crested Lark.
 282. *Alauda gulgula lhamarum* R. & A. Meinertzhagen : Kashmir Small Skylark.

Family : Hirundinidae : Swallows

283. *Riparia riparia diluta* (Sharpe & Wyatt) : Siberian Collated Sand Martin.
 284. *Riparia paludicola chinensis* (J.E. Gray) : Indian Grey-throated Sand Martin.
 285. *Herundo rupestris* Scopoli : Crag Martin.
 286. *Hirundo concolor concolor* Sykes : Dusky Crag Martin.
 287. *Hirundo rustica rustica* Linnaeus : Western Swallow.
 288. *Hirundo smithii filifera* Stephens : Indian Wiretailed Swallow.
 289. *Hirundo fluavicola* Blyth : Indian Cliff Swallow.
 290. *Hirundo daurica nipalensis* Hodgson : Himalayan Striated or Redrumped Swallow.
 291. *Hirundo daurica erythropyges* Sykes : Indian Striated or Redrumped Swallow.
 292. *Delichon urbica cashmeriensis* (Gould) : Kashmir House Martin.
 293. *Delichon nipalensis nipalensis* Moore : Nepal House Martin.

Family : Laniidae : Shrikes.

294. *Lanius excubitor lahtora* (Sykes) : Indian Grey Shrike.
 295. *Lanius vittatus vittatus* Valenciennes : Indian Baybacked Shrike.
 296. *Lanius schach erythronotus* (Vigors) : Rufous backed Shrike.
 297. *Lanius schach tricolor* (Hodgson) : Blackheaded Shrike.

Family : Oriolidae : Orioles.

298. *Oriolus oriolus kundoo* Sykes : Indian Golden Oriole.
 299. *Oriolus xanthorhous xanthorhous* (Linnaeus) : North Indian Blackhead Oriole.

Family : Dicruridae : Drongos.

300. *Dicrurus adsimilis* (Bechstein) : North Indian Black Drongo or King crow.
 301. *Dicrurus leucophaeus longicaudatus* Hay : Indian Grey Drongo.
 302. *Dicrurus caerulescens caerulescens* (Linnaeus) : Indian White-Bellied Drongo.
 303. *Dicrurus aeneactans* (Hodgson) : Crowbilled Drongo.
 304. *Dicrurus aeneus aeneus* Vieillot : Bronzed Drongo.
 305. *Dicrurus remifer tectirostris* (Hodgson) : Lesser Racket tailed Drongo.
 306. *Dicrurus hottentottus hottentottus* (Linnaeus) : Hair crested or Spangled Drongo.
 307. *Dicrurus paradiseus grandis* (Gould) : Northern Large Racket-tailed Drongo.

Family : Artamidae : Swallow-Shrikes.

308. *Artamus fuscus* Vieillot : Ashy Swallow Shrikes.

Family : Sturnidae : Starlings, Mynas.

309. *Saroglossa spiloptera* (Vigors) : Spottedwinged Stare.
 310. *Sturnus malabaricus malabaricus* (Gmelin) : Greyheaded Myna.
 311. *Sturnus pagodarum* (Gmelin) : Blackheaded or Brahminy Myna.
 312. *Sturnus contra contra* Linnaeus : Indian Pied Myna.
 313. *Acridotheres tristis tristis* (Linnaeus) : Indian Myna.
 314. *Acridotheres ginginianus* (Latham) : Bank Myna.
 315. *Acridotheres fuscus fuscus* (Wagler) : Northern Jungle Myna.
 316. *Gracula religiosa intermedia* A. Hay : Northern Hill Myna.

Family : Corvidae : Crows, Magpies, Jays.

317. *Garrulus glandarius* (Linnaeus) : West Himalayan Redcrowned Jay.
 318. *Garrulus lanceolatus* Vigors : Blackthroated Jay.
 319. *Cissa chinensis chinensis* (Boddaert) : Green Magpie.
 320. *Cissa flavirostris cucullata* (Gould) : Western Yellowbilled Blue Magpie.
 321. *Cissa erythrorhyncha occipitalis* (Blyth) : Himalayan Redbilled Blue Magpie.
 322. *Dendrocitta vagabunda bristoli* Paynter : Northwestern Tree Pie.
 323. *Dendrocitta vagabunda vagabunda* (Latham) : Northeastern Tree Pie.
 324. *Dendrocitta formosae occidentalis* Ticehurst : West Himalayan Tree Pie.
 325. *Nucifraga caryocatactes hemispila* Vigors : Himalayan Nutcracker.
 326. *Corvus splendens splendens* Vieillot : Indian House Crow.
 327. *Corvus macrorhynchos culminatus* Sykes : Indian Jungle Crow.

Family : Campephagidae : Cuckoo-Shrikes & Minivets.

328. *Hemipus picatus capitalis* (Horsfield) : Brownbacked Pied Flycatcher-Shrike.
 329. *Tephrodornis pondicerianus pallidus* Ticehurst : Sind Wood Shrike.
 330. *Coracina novaehollandiae nipalensis* (Hodgson) : Himalayan Large Cuckoo Shrike.
 331. *Coracina melaschistos melaschistos* (Hodgson) : Dark Grey Cuckoo-Shrike.
 332. *Coracina melanoptera melanoptera* (Rupell) : Himalayan Black-headed Cuckoo Shrike.
 333. *Pericrocotus flammeus speciosus* (Latham) : North Indian Scarlet Minivet.
 334. *Pericrocotus ethologus favillaceus* Bangs & Phillips : West Himalayan Long tailed Minivet.
 335. *Pericrocotus roseus roseus* (Vieillot) : Rosy Minivet.
 336. *Pericrocotus cinnamomeus peregrinus* (Linnaeus) : Northern Small Minivet.

(To be continued)

Bird Migration in Suraha Lake, Ballia, U.P.

By

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Once a bird's paradise, Suraha Lake was a happy hunting ground for the duck shooting men in the Eastern Uttar Pradesh. This vast lake with an area of 20 sq. miles is situated in Ballia district. It is situated between $25^{\circ} 48'$ and $25^{\circ} 52'$ North latitude and $84^{\circ} 8'$ and $84^{\circ} 12'$ East longitude. Till more recently, say two to three decades ago, this lake provided all that naturalists or shooting men could hope for. Here during the course of a winter season one could count on seeing practically most of the species of migratory geese and ducks which visited northern part of the country, including the occasional rarity. Even today the old world species of common coot (*Fulica atra* Linn.) which was a regular visitor in thousands, is seen though limited to a few hundred only (Table 1).

At times the ducks and teals were concentrated in almost incredible numbers and the concerted roar of their wings when they rose to the first shot of the day was a sound that will not easily be forgotten. The greatest concentrations were usually to be seen during the migration assemblies at each end of the season. Nevil (1970) in the District Gazetteer writes, "snipes visit but less in number on the edges of the lake, water fowl are abundant during the cold weather, when the lake is covered with geese and ducks of many varieties". Slowly year after year the situation changed when more and more area was exploited for cultivation. In a short duration intensive shooting diverted them away from the lake.

When severe cold engulfs their natural habitat in the northern heights they migrate to warmer south and usually they visit this lake from early winter just after the paddy is harvested. High dignitaries of the state used to camp here for weeks in every winter enjoying shooting. Earlier every Monday was fixed for shooting, later on Thursday was also included in a week. Since last decade I find that the frequency is unlimited. There was a time when one good shot could bag more than a dozen birds in a few shots but now position is just reverse. The birds are so much shy that inspite of our best efforts we could not get them in our shooting range for two days in 1973 visit.

In February, 1973, when I visited this lake, I found only two groups of common coots approximating two hundred, and the ducks and teals were quite a few in number. In February, 1974, the number of birds observed was just half of the preceding year. In February, 1975, I could not see a single duck or coot during the day except report of a few which were visiting in the night and leaving in the early morning (Table 1).

Table 1

Migratory Birds observed at Suraha Lake during February, 1973 to February, 1975

Bird	February 1973	February 1974	February 1975
	24.2.1973- 3.3.1973.	11.2.1974- 18.2.1974	8.2.1975- 17.2.1975
	Approx.	Approx.	Approx.
1. <i>Fulica atra</i>	200	100-120	60-70
2. <i>Netta rufina</i>	120 ♂ + 4 ♀	6 ♂	—
3. <i>Podiceps ruficollis</i>	150	50-60	50-60
4. <i>Anas querquedula</i>	300	150-120	150-200
5. <i>Anas strepera</i>	5	—	—
6. <i>Spatula clypeata</i>	30-40	—	—
7. <i>Aythya nyroca</i>	—	—	—10

It was reported that birds came in early December and were seen till early March of 1972-73 while in 1974-75 they came in late December and left by middle of January. The number of birds arriving in 1974-75 was large, but due to heavy rush of shooting they were not seen after middle of January. Besides other factors which are given below in suggestions shooting is one of the main factors.

Suggestions:

Complete ban on shooting is most desirable in this lake. Government should enforce the wildlife protection laws and the fishermen should be approached for not providing their boats for shooting purpose. A strict vigilance is needed and local authorities and people should be asked to co-operate in preservation of this natural wealth.

Although netting of these birds is already prohibited, yet unauthorised netting has been reported which should be checked. Netting causes less damage than large scale shooting.

In this connection I may mention that in a small pond around Jalmandir at Pawapuri, Bihar, where any sort of killing is strictly prohibited, one encounters thousands of ducks roosting fearlessly during winter season. Suraha Lake also can be maintained as a water bird sanctuary, at least, in a part if not the whole lake.

Water hyacinth covering miles of area in lake should be eradicated, as it does not allow the growth of marshy as well as emergent vegetation of the lake which provide shelter and food to these birds.

The foregoing account gives an idea of how interference of man, whether deliberate or not, can affect quickly and drastically the status of birds, mainly game birds of widely differing habits and environment, both indigenous and migratory.

Comments on the mid-term assessment report on Project Tiger by the IUCN & WWF team—

March/April 1976

Owing to pressure of professional work I have been unable, in the limited time available, to study this report as carefully as I should have liked to, particularly as its tight-packed style and cross-references call for concentration and continuity in the reading. However, my comments on the report are neither casual nor peripheral.

Owing to the need, imposed on me by circumstances, to present this critique of the report (actually, this is a critique of a critique) as briefly as possible, I am reluctantly compelled to limit my appraisal only to certain critical points, and do not have the space to specify my agreement with, and even admiration for, many points made in the report. I can only regret this limitation.

In spite of its searching enquiries of numerous sources and manifest sincerity, the report, intended as a major constructive contribution to the more effective implementation of Project Tiger, would have been more realistic had it taken due note of prevailing constitutional limitations and been better informed factually in certain particulars. My comments are confined to these aspects of the report and I present them as discrete items, not arranged in any order of precedence, in the interests of clarity and fairness, and where necessary (because it is not obvious) I have specified the interrelationship of these items.

Since I cannot be present at the meeting of the Steering Committee on November 16, 1976, I should add that I do not underrate the value of the critical slant and freedom from prejudice of this mid-term report, and sincerely trust that my own criticisms of the report will receive the same recognition of fairness and freedom from bias.

1. Though Shri M.K. Ranjitsinh is one of the authors of the report, the constitutional and human difficulties in the way of implementing Project Tiger by means of prescriptions have been insufficiently appreciated. That they have not been overlooked is seen from passages in the text—for instance, paragraph 138 at page 38. As the constitutional position stands (one hopes for a helpful change in the future) the Field Directors are not directly responsible to the Director, Project Tiger, or even to the Steering Committee, and the major achievement of what may be termed the miracle of Project Tiger, the involvement of the State Governments with a Central scheme and the necessary involvement of the departmental heads, has not been adequately appreciated. Members of the Steering Committee

will know the adjustments and waits that have been necessary from time to time on this account, and the continuous effort to secure a closer realisation of the aims and objects of Project Tiger by means of persuasion, exhortations and appeals to relevant authorities. Again I should say that this problem has not been overlooked entirely in the report.

For instance, the last paragraph on page (ii) of the SUMMARY AND MAJOR CONCLUSIONS, which delicately and too vaguely suggests the "interventions at very senior Government level" at the Corbett, Simlipal, Manas, Palamau and Sunderbans Reserves, seems to recognise this. At what governmental levels are these interventions to be sought, and would such seekings be of the Central or State Governments or both? Presumably, both. I am in a singularly apposite position to write the next two sentences, never having been involved with any administrative function of the Steering Committee or its secretariat (the office of the Director, Project Tiger) and having only served on the committee as a field naturalist concerned with ecology and conservation. With reference to the duties of the Director, Project Tiger, as specified in paragraphs 134 and 135 at page 38 does not the report impose on him responsibilities patently beyond his reach as the constitutional position stands, and fail to specify where and how he has failed in the discharge of his duties—a wholly inequitable lapse in a critique for it is a basic principle of all criticism that it should be specific? And have the authors of the report, in the course of their tours and detailed enquiries, failed to note the mental reservations, preoccupation with matters not directly related to the Project, and, with regard to certain prescriptions of the Project, what Ernest Brahma so aptly terms a 'no-enthusiasm' in some of the officials actually concerned with the implementation in the field of Project Tiger? Since these are not overtly expressed and since the Steering Committee (leave alone its Secretary) does not, in fact, have formal, effective supervisory control of the day to day administration of the Reserves, nothing much can be done about such things—except by the suicidal recommendation to derecognise a Reserve, undoing all the work and effort so far done and expended.

The authors of the report appreciate the need for time to implement what is unquestionably a unique conservation project: this is clear from passages in the text, such as the last sentence of the penultimate paragraph of page (ii) and the paragraphs it refers to. I cannot help the feeling that the very circumstances in which Project Tiger is placed require that patience, time and limitation to protection (not yet fully achieved) as the primary objective, should be considered unavoidable at this stage. In my opinion, and I realise I may be alone in this, we are not in any mid-term of Project Tiger but still at the start, and that a start has been made at all and is being slowly developed into progress is an achievement in itself, considering the values and needs of human life in India at present (of which it is exceedingly difficult, if possible, for anyone but Indians to have a fair idea).

2. I differ basically from the authors of the report with regard to the prime object of Project Tiger as suggested by them in the third paragraph of the first page (SUMMARY AND MAJOR CONCLUSIONS) of their report. The Project is concerned with the conservation of the threatened tiger by means of environmental conservation and protection and by protection I mean not only protection from poachers and hunters but from all depletive or materially influential human activities—from detrimental and artificial influences. I submit that in such a vital and important matter, it would be unrealistic in the extreme to stipulate that the effort should also be directed at preserving all the botanical habitat types (I shall return to this small point, a purely technical point, in the next numbered paragraph) in which the tiger is known. I do not mean that literally. What I am saying is that the conservation of habitat types *per se* is a quite unimportant matter compared to the main object of the project, the conservation of the tiger and associate animals. At this stage, to make my point unmistakably clear, I shall break up this complex and vital consideration into specific sub-paragraphs.

i—Project Tiger could not have been implemented in all the areas in which the planners of the Project (by no means limited to a Task Force) might have wished it implemented. Only those States willing to come into the Project could be considered. An example (which is not wholly hypothetical) will help. I myself come from near the distinctive, stunted evergreen forests of the Mundanthurai Sanctuary of Tamil Nadu, and for various reasons I think it a wholly unsuitable preserve for being set up as a Reserve under the Project. But supposing it had been the ideal area and the most likely and promising of all contemplated Tiger Reserves, even with the added inducement of gaining a fresh lease of life for the liontailed monkey here, it could not have been included in the Project because Tamil Nadu was not willing to concede the basic requirements of the Project. However, a favourable political climate *per se* would not have been the main consideration for the selection of the Reserves—this, too, must be made clear here. Supposing (this is purely hypothetical) Gujarat had been willing, even eager, to participate in the Project, and further supposing that in Gir Forests there were a few (say 4 or 5) tigers, in spite of the unique faunal setting this would have offered, almost circus-like in its appeal, mature ecological judgement would have decided against the proposal.

ii—The Sunderbans, in spite of the difficulties inherent in its development into a Tiger Reserve, and in spite of the difference of opinion regarding its tiger population (some hold it is an accidentally segregated population), was included in the Project though not originally considered, purely because of its unique setting and its being a *viabile* preserve. But had the choice lain between Ranthambhor,

smallest of the Reserves, and the Sunderbans (nearly 8 times as extensive), I, for one, would unhesitatingly have opted for the former because it is the more likely preserve for achieving the objective of the Project, the revival of the tiger and associate animals in India. It will not be out of place to mention here that in the bad old days when the best tiger areas were those in which tigers could be shot and not conserved, Ranthambhor and a forest practically on the same latitude and only about a hundred miles away, with much the same dry deciduous *dhok* forests and much the same associate animals and even much the same sources of water (in lakes), Shivpuri in Madhya Pradesh, were the prize tiger forests of the country.

iii—In my opinion at least, the likelihood of the preserve offering good scope for protection from human disturbance and depletion should be (should have been, actually— I confess to a school—mastering past) an important consideration in selecting a reserve. For this reason, I now think (although I formerly advocated it warmly) Periyar unsuitable. Almost insuperable protection problems are involved in Periyar, and their virulence has increased in the last few years. Paragraph 145 at page 42 of the report is formally the correct citation for offering this comment, but it is ecologically sounder to offer it here, as an adverse boitic factor that merits very serious consideration.

iv—In the conditions prevailing in India today, it would be unwise to consider the mere magnitude of the area of a reserve as an important factor—not merely unwise, but ecologically immature. Paragraph 20 at page 6 suggests that Bandipur should be absorbed into the proposed Jawahar Wildlife Sanctuary. Along with the Director, P.T., I visited the Wynad Sanctuary adjoining Bandipur, and have a long and intimate knowledge of the Mudumalai Sanctuary and know Nagarhole well. Protection problems would be increased enormously, little will be gained for the Project (because we would be biting off much more than we can chew) and the conflicts likely to develop between the 3 State authorities may well become vexatious should this proposal in the report be realised. Bandipur has enough protection and tourism problems as things are to merit a breathing-space to sort them out and solve them without the added burdens that the proposal would entail. Luckily, it now seems unlikely that the 3 States will agree to what they originally suggested, mainly as a move to develop tourism.

3. Fortunately Shri Seth, co-author of *The Forest Types of India* and the technical authority behind the book (Champion was not a botanist) is now on the Steering Committee, and will bear out what is said below with regard to paragraph 3 of the first page of the

SUMMARY AND MAJOR CONCLUSIONS OF the report, and paragraph 21 at page 6. All systems of botany, whether taxonomic or ecological, are unavoidably artificial to some extent and serve mainly to identify specific plants and types of natural vegetation. Ecological classifications cannot be rigidly applied. Depending not only on climate (including rainfall and temperature) and elevation, but also on the depth, physical structure, chemical composition, and moisture and air retentive potential of the soil, plant associations may vary bewilderingly, even in size as distinct from variations in species, within a square kilometre of forest—as can be demonstrated in Bandipur. I do not have any pretensions to botanical expertise (though I do have other pretensions!) but with the aid of experts and a sincere attempt at re-education in botany have tried to familiarise myself with the vegetation of various forests in India for over 30 years now, and may assure the authors of the report that (mainly by good luck) the Project has been able to secure for its Reserves highly varied and typical types of forests, representative of most of the main forest 'types' of India.

The conservation of the tiger and associate animals is the main object of the Project: forests come in as a most important environmental factor, and as sources of fodder and cover, but are secondary to the main consideration.

4. The report seems somewhat undecided over the question of tourism: reference may be made to paragraph 3 of page (ii) of the SUMMARY AND MAJOR CONCLUSIONS and to paragraph 97 at page 26, also paragraphs 98 on the same page and 99 on the next.

The authors say they visited Corbett Park and Bandipur and Ranthambhor. How did they fail to observe, apart from the mortal conflict between tourism and conservation at Corbett Park, the massive invasion of the core (in spite of boards put up by the Field Director to say the area is closed to visitors) at various points, the way the tourists at Bandipur (who do not invade the core) shout at the animals and approach elephants too close, and the nonexistence of a core area closed to tourists at Ranthambhor? This is truly remarkable.

5. It has been assumed throughout the report that protection is now efficiently organised, and such references as are made in it to the need for protection concern poaching and organised tribal hunts in some of the Reserves (paragraph 49-51, page 14).

In what follows, I submit, my authority may be accepted. I have worked, no doubt off and on but on an aggregate for a great many years, on the human biotic factors depletive of wildlife in many forests of India, including many of the Tiger Reserves now set up. Disturbance by humanity is a most serious depletive factor, even if the men approach the animals with no harmful intent in their hearts but only love and goodwill. Men on foot have a most unsettling influence on animals—only the ravaging jaws of dhole actively chasing them will induce wild animals in the Tiger Reserves (now contemplated or existing)

to suffer the proximity of men. The result of sustained disturbance by men manifests itself in many ways, differently in different animals, but two typical responses are the development of normally diurnal animals into shy, fugitive creatures of the night (Simlipal) and, where they have been subject to over much disturbance by men in motor vehicle, the instant flight into cover by animals on hearing the sound of an approaching motor vehicle—with considerable difficulty, I have been able to present the Steering Committee with photographic proof of such behaviour from Bandipur. I was distressed to find that even in Ranthambhor the animals now flee from the sound of an approaching jeep—hardly surprising considering how men on foot and in cars are regular features of the core area.

Further, human traffic in core areas may well have a quite disastrous effect on the native flora by the accidental introduction of exotic plants.

Villages have been abandoned in remote jungles in the past because of some epidemic or other large-scale disaster (Eeranamunti in Bandipur). But so far in the hoary history of our country, villages established for centuries have not been moved out of forests by inducements and persuasion—this great achievement in more than one Tiger Reserve fully merits the plaudits it has received. The great, the difficult, thing has been done but we have not been able to prevent people from invading the core areas on foot and in motor vehicles.

Until total protection from non-criminal human trespass, and control of poaching to the extent possible, has been achieved in all the Tiger Reserves, this should be our main concern. Other things can come later. They will take no harm from being put off for a while.

6. With reference to the paragraph title *Direction and Coordination* at page (iii) of the SUMMARY AND MAJOR CONCLUSIONS and the references cited therein: I think the addition of two research specialist to the Steering Committee is wholly unnecessary: Shri Seth is there already and is perfectly capable of organising research. Further, it is a truism that too many cooks spoil the broth. Such a move can only be an encumbrance.

Minor Points

1. The water hyacinth is not mentioned as an exotic weed. Does it not occur in Tiger Reserves? Is *Cassia tora* exotic? *Lantana* is now accepted by wild animals, and even browsed desultorily by them: it provides excellent cover.
2. Where does the Nilgiri Langur occur in Bandipur?

M. Krishnan

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On 'Shooting Down Paper Tigers'

(Continued from Cheetal, Vol. 19 (4), Page 54)

In his letter published in the Manchester Guardian on May 19th, 1978, the former Inspector General of Forests of India, Dr. S.K. Seth, offers a number of comments on the IUCN/WWF report on Project Tiger, of which I am one of the authors, which cannot be left unanswered.

First, Dr. Seth calls the report the "Leyhausen report", obviously in an attempt to create the impression that it presents mainly my views and that my co-authors had little to say in the matter. This is ludicrous. We all three were fully independent and none of us made any attempt to influence the others' opinion in any way. In fact, there was full agreement on all major findings, conclusions and recommendations; some discussion arose only about the best way of putting our findings into words.

Second, Dr. Seth claims that we were deficient in our understanding of Indian affairs and that all India experts were agreed on this. The first claim is certainly a slur on my friend and colleague, Mr. M.K. Ranjitsinh, whom I should hope no-one suspects of not knowing conditions in his own country, which he served and still serves in such a distinguished manner; the second is blatantly untrue; The Steering Committee of Project Tiger has—according to my information—resolved that all major recommendations of our report should be implemented. Strangely enough, Dr. Seth finds nothing amiss with our understanding of Indian affairs where we had reason to praise Project Tiger's achievements, and quotes at length.

Third, Dr. Seth attempts to question my own competence as far as the tiger is concerned. He might be astonished to learn that even my doctor's thesis of nearly forty years ago was about lions, tigers and their hybrids, and that since then the tiger has never been out of my orbit. Besides, to survey a conservation project like Project Tiger, something more is required than being narrowly specialised tiger expert.

The most important bone of contention is our statement that a tiger population increase of more than 2% per annum is highly unlikely. We did not, though, doubt the actual increase in tigers in some of the reserves, as reported; the inference is, of course, that the more effective protection within the reserves has attracted tigers from outside, a possibility which Dr. Seth himself admits. What we did object to was the attempt, made in some publications, to conclude from this that a similar increase of the Indian tiger population as a whole had taken place.

As to the possible annual increase, Dr. Seth counters with the statement that "the lion in the Serengeti reproduces at the rate of 6-8% and all zoos are aware that tiger breeding in zoos is profuse"—I am afraid Dr. Seth does not understand population dynamics and fails to realise the difference between reproduction rate and population increase. The lion

population in the Serengeti is—with slight fluctuations—stable and certainly not increasing. That population has now been closely studied for some 18 years, and a similar study on tigers has been carried out in the Chitawan National Park in Nepal for seven years running and is still going on. What is known from these studies is corroborated by all the more scanty observations from other sources we have of the population of the two species. In both species, cub mortality is between 50 and 60% and less than 25% live beyond the second year and reach maturity. In a tiger population of 100 individuals at best 30 are females in breeding condition. Since a tigress cares for her young until they are two years or older, she breeds only every two and a half to three years, and since she does not always become impregnated right away, of the 30 at best 10 have cubs in any one year. Cubs number between 2 and 4, on average less than three. The maximum number of cubs per year is therefore 39. (Dr. Seth mentions 55 cubs for 400 tigers. According to this calculation there should have been 120. Even assuming that not all the cubs had been counted, the mortality rate of over 50% is supported by Dr. Seth's own data). 25% of this figure of 30 is 7-8. Now, of the 100 tigers, about 70 will be adults of breeding age and beyond. The average lifespan of an adult tiger or lion is in the vicinity of 15 years, so $1/15$ of 70 = 5 adult animals will have to be replaced annually. This leaves us with 2-3 animals in surplus and with a small margin to account for accidental deaths etc. and a maximum of 2% real annual increase. And it should not be forgotten that throughout this calculation we have been assuming the most favourable conditions. Breeding figures and survival rates from zoos do not come into it at all. In a zoo, a lioness or tigress may have her first litter at the age of 18 months or even less, cub survival is greatly enhanced by human care and interference, and the causes of subadult mortality prevalent in the wilds are practically absent from zoo conditions. 2% per year is by no means contemptible. It means doubling the population every 35 years! If the lions in the Serengeti did actually increase at a rate of 8%, as Dr. Seth seems to believe, they ought to double their numbers every nine years. Not even the most fervent friend of lions and tigers could wish this, I am sure. The fact is that very large predators normally tend to keep an even balance of their numbers, and even the 2% rate of increase can be obtained only under exceptionally favourable conditions, and only temporarily. Since they have no natural enemies, the mechanisms of this population balance are intrinsic and very delicate. That is one reason why predator populations succumb to hunting pressure so much more easily than ungulate populations. It is, therefore, incomprehensible that people should take exception to our statement. It marks indeed great success. But we should not allow fantasies and wishful interpretations of observed facts to raise disproportionate expectations which can then end only in disappointment and frustration.

Finally, the critical tenor of our report in itself seems to have given offence. This is somewhat irrational, as the whole idea of undertaking the survey was to discover any weaknesses and errors. We were very careful not to lay blame at anyone's door in particular. It should be obvious that a conservation project on the unprecedented scale of Project Tiger cannot be implemented without committing errors and mistakes. Other people might have made different errors, but all the same, they would surely have made some. Our task concerned not the past but the future of the tiger. Furthermore, what was most pressing and right at the beginning more and more ceases to be so as it is being successfully dealt with, and consequently other aspects of the undertaking come to the foreground and claim first consideration. Certainly it was right first to secure the existence of the tiger where it still did exist. This done, however, it must become more and more apparent that the future of the tiger depends on the future of the people living in and around tiger country. If the socio-economic problems of these are not solved, the tiger reserves will not last, not to mention the great majority of tigers, still living as they are *outside* the reserves and national parks. It is with the people and their problems that the future of the tiger rests; with the tiger, then, there will be no problem. But unless those problems are solved, there is no future, for the tiger or for the people. For the tiger is only symbolic of a country struggling to regain at least some of its former ecological balance and thereby secure a future for her children.

Prof. P. Leyhausen
Chairman Cat Specialist Group
Survival Service Commission
I.U.C.N.

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**THE NILGIRI WILD LIFE ASSOCIATION,
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On a Collection of Fishes of District Kangra (Himachal Pradesh)

By

RAJ TILAK* AND D.P. JUNEJA**

Zoological Survey of India, Solan

Introduction

The fish fauna of Kangra district (Himachal Pradesh) has not been known so well. Menon (1951) described two new species of the genus *Noemacheilus* from Kangra. Sehgal *et al.* (1971) published a report on the fishes of Kangra valley and adjacent areas; the geographical limits covered in this work are much wider than the present limits of district Kangra. Tilak and Husain (1977a) reviewed the literature on the fish fauna of Himachal Pradesh and prepared a check-list of 77 species reported from this State and subsequently, while reporting on the fishes of Sirmour district (Himachal Pradesh), they (Tilak and Husain, 1977b) mentioned three additional species, not so far reported from Himachal Pradesh. Recently, a vast collection of fishes made by the authors from district Kangra during 1976, has been studied and it is discovered that there are 35 species in this collection of which 4 species are new records for Himachal Pradesh.

The collection of fishes has been made from district Kangra from a large number of streams. The list of localities from where the collection has been made and the list of species of fishes of this district are given in this paper.

List of Localities in District Kangra from where Collection had been made

(The species collected from each locality are shown by the numbers in parenthesis against each locality indicating the corresponding serial number of the species in the list of fishes given below)

1. Neugal Khud, 2 kms. from Sujanpur Tira, on Sujanpur-Thural road ... (8,9,30,35)
2. Moul's Khud, 7 kms. from Sujanpur Tira, on Sujanpur-Thural road ... (22,32,35)
3. Neugal Khud near Thural ... (17,30,35)
4. Chamaar nullah, 4 kms. north of Thural ... (1,3,26)
5. Sukni Khud, 6 kms. north of Thural on Thural-Palampur road ... (2,3,22,30,33,35)
6. Neugal Khud, 7 kms. from Palampur on Neugal-Bindraban road ... (1,2,3,17)
7. Soon Khud, 8 kms. from Palampur on Palampur-Pathankote road near Maranda village ... (1,3,6,8,17,22,32)
8. Moul's Khud, 5 kms. from Palampur on Palampur-Rajpur road ... (2,17)

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9. Pun Khud, 12 kms. from Palampur towards Baijnath ... (2)
10. Ava Khud, 9 kms. from Palampur on Palampur-Baijnath road ... (2,26)
11. Bhiral Khud, 6 kms. from Palampur on Palampur-Pathankote road ... (1,2,17,22)
12. Manjhi Khud, 8 kms. from Dharamsala on Dharamsala-Pathankote road ... (2,4,8,9,13,18,22,24,26,30,32)
13. Churan Khud, 6 kms. from Dharamsala on Dharamsala-Kangra road ... (2,4,8,21,30,32)
14. Khaul Khud, 1.5 kms. from Shahpur towards Palampur ... (2,3,5,8,9,17,30)
15. Chambi Khud, 5 kms. from Shahpur towards Palampur on Palampur-Pathankote road ... (2,13,22,30,35)
16. Gaj Khud, 9 kms. from Shahpur near Rait village ... (2,4,6,9,17)
17. A stream near Rait village, Shahpur ... (4,5,6,22,33)
18. Ban Ganga, 3 kms. from P.W.D. Rest House, Kangra ... (2,5,9,30)
19. Manuni Khud, 11 kms. from Kangra on Pathankote-Manali road, near Matuar village ... (2,4,21,32)
20. Baner Khud, 5 kms. from Kangra towards Gupt Ganga ... (2,4,6,15,19,27,30,32,34)
21. A pond near Kangra Mandir Railway Station, Kangra ... (5,8,9,18)
22. Nakeri Khud, 10 kms. from Dehra Gopipur on road to Jawalamukhi ... (2,6,8,16,18,20,21,31,34,35)
23. Along river Beas, Dehra Gopipur ... (5,8,9,10,11,12,14,17,22,28,29,30,31,33,34,35)
24. Loond Khud, 14 kms. from Dehra Gopipur on road to Jawalamukhi ... (2,5,9,13,15,17,32)
25. A stream near Dehra Gopipur ... (3,12,13)
26. A pond near Jaritika village, Dehra Gopipur ... (3)

Systematic List of Fishes

Class : Teleostomi

Super-order : Ostariophysi

Order : Cypriniformes

Family : Cyprinidae

1. *Barilius barila* Hamilton
2. *Barilius bendelisis* Hamilton
3. *Barilius vagra* Hamilton
4. *Brachydanio rerio* (Hamilton)
5. *Crossocheilus diplochilus* (Heckel)
6. *Danio devario* Hamilton
7. *Esomus danricus* (Hamilton)
8. *Garra gotyla gotyla* (Gray)
9. *Labeo dero* (Hamilton)

9. *Puntius chola* Hamilton
 10. *Puntius sarana* Hamilton
 11. *Puntius sophore* Hamilton
 12. *Puntius ticto* Hamilton
 13. *Rasbora daniconius daniconius* (Hamilton)
 14. *Salmostoma bacaila* (Hamilton)
 15. *Salmostoma punjabensis* (Day)
 16. *Schizothorax richardsonii* (Gray)
 17. *Tor putitora* (Hamilton)
 18. a) *Cyprinus carpio communis* Linnaeus
 19. b) *Cyprinus carpio nudus* Bloch
 20. c) *Cyprinus carpio specularis* Lacépède
 Family : Cobitidae
 21. *Botia dayi* Hora
 22. *Lepidocephalus (Lepidocephalichthys) guntea* (Hamilton)
 23. *Noemacheilus botia* (Hamilton)
 24. *Noemacheilus horai* Menon
 25. *Noemacheilus montanus* (McClelland)
 26. *Noemacheilus spilopterus* (Valenciennes)
 27. *Noemacheilus rupecula* (McClelland)
 Order : Siluriformes
 Family : Amblycipitidae
 28. *Amblyceps mangois* (Hamilton)
 Family : Bagridae
 29. *Mystus (Mystus) bleekeri* (Day)
 Family : Heteropneustidae
 30. *Heteropneustes fossilis* (Bloch)
 Family : Sisoridae
 31. *Glyptothorax pectinopterus* (McClelland)
 Super-order : Atherinomorpha
 Order : Atheriniformes
 Sub-order : Exocoetoidei
 Family : Belontiidae
 32. *Belone cancula* (Hamilton)

Super-order: : Actinopterygii

Order: Channiformes

Family: Channidae

32. *Channa orientalis* Bloch & Schneider

33. *Channa punctatus* (Bloch)

Order: Perciformes

Sub-order: Percoidei

Family: Centropomidae

*34. *Chanda ranga* Hamilton

Sub-order: Mastacembeloidei

Family: Mastacembelidae

35. *Mastacembelus armatus* (Lacépède)

(* denotes a new record for Himachal Pradesh)

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Book Review

BACK TO THE WALL: Saga of Wildlife in Bihar—India by S.P. Shahi, published by the Affiliated East-West Press Pvt. Ltd. 159 pages with a Foreword by Dr. Salim Ali. 90 colour and 90 black-and-white photographs, and a few maps. Price Rs. 120.

A few decades ago Bihar was one of the most forested States of India with extensive sal forests as pleasing to the eye as they were important as habitats for wildlife and suppliers of timber and other produce. Today the forest area has shrunk to 31,000 sq kms out of the total area of the State of 1,73,876 sq kms, and the reason is that in spite of the general economic backwardness of Bihar, it has the largest number of mining companies and coal fields. Apart from bad land use practices in general, mining companies who never think of rehabilitating land from which the ore has been extracted, have been largely responsible for the eroded quality of the landscape. The Forest Service in Bihar, as in all other States, did not have the administrative power or the moral courage to resist this denudation even in the forested tracts. If they had done that, the life of the majority of the people, dependant as they are on good soil, clean water, and vegetation and animal life, would have been much securer than it is today.

Under the prevailing conditions, not surprisingly, preservation of wildlife was not given any priority. In fact one is amazed to learn from S.P. Shahi that during his student days at the Indian Forest College, Dehra Dun, between 1940 and 1942, there was no course in wildlife management. "There was if I remember correctly, a lone paragraph in silviculture under an insignificant sub-heading—injuries by pests to nurseries and forest crops." They were informed that sambar, chital and wild boar were pests of the forests, and prevented the establishment of nurseries and the raising of plantations, and that the sal, *Shorea robusta*, had little future because the seedlings on the forest floor were eaten up by the herbivorous animals. We might remind ourselves now that the seeds of this magnificent tree have become the base of many valuable agro-industries in the country.

It is evident from Shahi's book that he was an unusual Forest Officer in the sense that he was passionately fond of wildlife and took the trouble to keep careful notes and photographs where possible of everything that he saw. He went through the literature of the past so that the status of wild animals today in various localities could be compared with the situation existing in the heyday of wildlife many decades ago. These references to the literature of old contain some fascinating facts. For example, reference is made to A Mervyn Smith's book 'Sport and Adventure in the Indian Jungle (1904) where he refers to the Cheetah. As in well known the Cheetah was used by the Princess for the hunting of

blackbuck. Smith says that "for purposes of hunting the antelope and other small deer the Cheetah must be caught when full-grown, and then domesticated. When taken as cubs they never learned to hunt." This confirms the problem faced by conservationists today in introducing zoo bred animals to the wild: the incapacity of these animals to hunt and live on wild prey. Unless the young cubs are out hunting with their mothers, and have learnt the technique of bringing down wild herbivores to earth, they would starve even if introduced in satisfactory habitats.

Mr Shahi's book makes interesting reading because the descriptions are based on his first-hand experience, and are not stale comments garnered from books or from others, and dished out again. The chapter on the Grey Wolf is particularly significant because the wolf is a very rare animal in India today. Shahi himself says that in his 30 years of service in the forests, he had not seen a single wolf until the time of his retirement. With a great deal of trouble he was able to locate a pack in the Mahuadaur valley in Palamau District adjoining Madhya Pradesh. This valley seems to be fairly inaccessible, and it is estimated that there are 11 wolves in this area. The valley is now being notified as a Wolf Sanctuary, and conservationists in India and abroad will watch its progress with great interest.

Now that the human population has proliferated so widely over previously wild areas, we will have to discover techniques of how to live in proximity with wildlife without suffering their depredations and without retaliating and exterminating them in revenge. Mr. Shahi refers to the case of the Panther of Canary Hill which is not untypical of what has been happening every where. The small 800 hectares of sal forest surrounding the Hill, together with its environs, were good hunting ground for the Panther, and it presumably lived on young wild boar, barking deer and other wild herbivores. When cattle grazing extended into this area the Panther took to killing a cow a week on an average, but the villagers removed the carcass "sometimes almost snatching it from the Panther's mouth". The Harijans took away the hide and the others ate the meat so that while the cattle continued to be destroyed the Panther remained hungry, and he killed far more cattle than he would have done in normal circumstances. This is exactly what has been happening in the Gir Forest in Gujarat where the Lions which have got habituated to killing cattle are deprived of their legitimate meal by Harijans and by vultures. The lesson from these incidents is clear. We will have to institute strict principles of zoning in our country so that viable Sanctuaries are left for wildlife even within the heavily populated countryside. If we do so we will save a great deal of the wildlife which still remains, and allow it to increase within reasonable limits. During his researches in Nepal Seidensticker found that even Tigers are prepared to live in fairly restricted areas surrounded by villages provided

there was adequate wild prey for them in this habitat. This is a most encouraging finding which our policy makers must note with care.

In the initial pages Mr. Shahi said that he decided to write this book because he felt that some such effort was necessary to inform the terribly ignorant youth of Bihar about the magnificent wildlife which existed in the State. Actually this book is valuable not merely for the amateur, but should be in the library of all naturalists. The price of Rs. 120, however, places it beyond the reach of ordinary mortals, but perhaps school, college, and club libraries could purchase copies and see that it is widely read.

Towards the end of this book the author sees fresh hope for India's wildlife as a result of the changes made in the Constitution. After Article 48 of the Constitution a new Directive has been included which reads "The State shall endeavour to protect and improve the environment, and to safeguard the forests and wildlife of the country." The Seventh Schedule of the Constitution has also been amended, and forests and protection of wild animals and birds have been brought on the Concurrent List. Both these subjects were dealt with exclusively by the States before this change. Let us hope that the new Government will involve itself in the conservation of nature with the seriousness which the subject deserves.

Zafar Futehally

Mr. Shahi refers to the case of the Panther of Canary Hill which is not untypical of what has been happening every where. The small 800 hectares of sal forest surrounding the hill, together with its environs, were good hunting ground for the Panther, and it presumably lived on young wild boar, barking deer and other wild herbivores. When cattle grazing extended into this area the Panther took to killing a cow a week on an average but the villagers removed the carcass, sometimes almost smothering it from the Panther's mouth. The Harjans took away the hide and the others ate the meat so that while the Panther continued to be destroyed the Panther remained hungry, and he killed far more cattle than he would have done in normal circumstances. It is his exactly what has been happening in the Gir Forest in Gujarat where the Lions which have got habituated to killing cattle are deprived of their legitimate meat by Harjans and privatisers. The reason for these atrocious actions will have to inspire strict principles of conduct in our country so that wildlife is left for wildlife even within the heavily populated countryside. If we do so we will save a great deal of the wildlife which remains, and allow it to progress with its reasonable limits. During his research in Nepal, Schenckler found that even Tigers are prepared to live in fairly restricted areas surrounded by villages provided

Gamugul Siya-Behi Sanctuary, Himachal Pradesh

By

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We visited Gamugul Siya-Behi Sanctuary in September, 1972 (from 22nd September to 30th September, 1972), to study the Wild Life conservation problem particularly that of Kashmir stag in the Sanctuary.

The Sanctuary situated in Bhandal Forest range. It starts from village Shanghni which is about 76 km. on inter state i.e., Chamba Bhadrura road. The Sanctuary is bounded in the north and west by the State boundary line with J.&K. in the south river Seul separate the Sanctuary from the buffer-zone and in the east Bhandal forest range. The situation of the Sanctuary actually between longitude N.77°12 min. and 30 second and 77° 45 min. and latitude E.32° 29 min. 50 second and 31° 58 min.

The climax vegetation below 11000 is moist temperate forest whereas much of the area is covered by grasses and shrubs most probably being the result of indiscriminate grazing and burning of the past. The major forest type is oak (white flower), Coniferous while at lower altitude i.e. between 5,000 to 8,000 ft. The principal species are Deodar (*Cedrus deodarus*), Kail (*Pinus* sp.) and these two often occur in association with Ban Oak (*Quercus incana*). Between 7,500' to 9,000' Spruce (*Picea morinda*) and Silver fir are quite common. There is an impressive record of varieties of mammals and birds:—

Mammals:—Kashmir Stag, Brown Bear, Himalayan Thar, Musk Deer, Leopard, Himalayan Black Bear, Shapoo or Punjab Uril, Grey Ghoral, Porcupine and Squirrel and some other common hill species.

Birds:—Western tragopan, Himalayan snow cock, Chakkor, Monal Pheasant and Koklas.

Exception interest of conservation area:—

The hangul is an integral part of the ecosystem which comprised the Gamugul Siya-Behi Sanctuary, and its future can only be assured by effective management of the area as a whole.

In general terms, wildlife sanctuaries should be managed to conserve representative samples of naturally occurring biotopes, to promote Scientific study of these area, and to encourage their use for educational and recreational purposes. As a sanctuary, the Gamugul Siya-Behi area has numerous attributes. It is the only area in the world, outside the State of Jammu and Kashmir, in which the hangul occurs, it has attractive scenery, its principal

climax vegetation provided a diverse environment and the area supports a good variety of wildlife species. Unfortunately, it also has a number of problems which limit its conservation function and may ultimately prevent its utilization as a multi-purpose conservation unit.

The major obstacle to effective conservation in the sanctuary is human disturbance, namely physical disturbance by a resident human population and its domestic animal, grazing by a variety of domesticated stock, woodcutting, burning, and poaching to an unknown degree. Furthermore, the Sanctum Sanctorum in which conservation effect might need to be concentrated, at least initially, probably fails to provide a year round ecological unit for much of its wildlife. In summer, some of its larger mammals and birds probably move across the state boundary line into an area over which the Sanctuary authorities have no jurisdiction. In winter, many species almost certainly move to altitudes below the Sanctum Sanctorum boundary.

Conservation Status

In the Maharaja's time, hangul were observed in the Sanctum Sanctorum throughout the year; they were most common in October during the rut. They were rarely observed below this block (i.e. lower than 9,000 feet altitude) and rarely seen in scrub or forests (it should be noted that the Guard did relatively little patrolling outside the sanctum sanctorum and probably spent little time in wooded area. Deer would be most conspicuous when stag were roaring during the rut). They tended to concentrate in grasslands after these areas had been grazed by sheep in July and August. (Shepherds spread salt in the pastures for their sheep, which probably attracted deer). The deer moved freely across the State border and appeared to favour the Jammu and Kashmir side. (The Guard considers the pastures in the north to be better; Ranjit Singh presumably believes that hangul avoid dry southerly aspects in summer).

Hangul have never been numerous; at its height the Gamugul Siya-Behi population probably never exceeded 20-25 animals.

Nowadays hangul are rarely seen in the Sanctuary, even by shepherds grazing their sheep at high altitude. Poaching by local people is unlikely to have been a significant factor in this apparent decline. Meat from domesticated stock is readily available and fairly cheap; there are no good hunters in Langeri (the main village near the Sanctum Sanctorum) and during the rut when hangul are most easily located most villages are busy with their harvest. Poaching has occurred, however, both before and after 1947. Poachers are believed to have come to from over the border. The Guard considered that poaching was generally more prevalent nowadays on the Jammu and Kashmir side of region (which, if correct, would clearly affect the numbers in the Sanctuary). A stag and carcase was found near the base of a glacier in the Mornu Mull (Phaijal Forest) in June, 1961. The animal had been dead for at least 3-4 months, no wounds were found at it was assumed to

have been killed in an avalanche. In the summer of 1971 also one carcase was located by the Game Guard in Siya-Behi area.

Other relevant information/recommendation

We may conclude that the Gamugul Siya-Behi area has very define potential as a wildlife Sanctuary, provided action is taken now to improve the conservation of its renewable-resources. The main conservation requirements are an extension of the Sanctum Sanctorum in which human disturbance would be reduced to an absolute minimum and an arrangement for reciprocal wildlife protection measures in adjacent area of the neighbouring state. In addition, a small wildlife staff needs to be established to enforce conservation measures and to collect basic wildlife data as an aid to more effective management.

If this action is taken the Sanctuary should be able to provide for a variety of conservation, scientific, educational and recreational activities, of which Scientific tourism in the Sanctuary and hunting in the buffer zone are likely to be most important in the foreseeable future.

Immediate action is recommended to reduce domesticated stock grazing in the new sanctum sanctorum; the ultimate aim should be to eliminate grazing in this area completely. It is suggested that grazing by buffaloes and goats should be banned IMMEDIATELY AND COMPLETELY and that grazing by sheep should be progressively curtailed over the next four or five years. Grazing for displaced animals should if possible be diverted to areas outside the sanctuary and buffer zone the Gujars from Bhales in J. & K. must not be allowed to cross through the area to avoid much unwanted disturbance and they should be asked to use motor road i.e. via Padhri to Langera. Alternative sources of subsistence and income for grazing should be explored as a means of reducing the number of stock in the area as a whole.

Burning should also be eliminated in the Sanctuary as soon as possible and wood cutting should be strictly controlled.

सांप—कितना दोस्त, कितना दुश्मन

हिन्दू धर्म में नाग को देवता माना गया है और उसकी पूजा की जाती है। नाग की पूजा हिन्दू धर्म में दो रूपों में की जाती है एक ओर वह उनके धन व सम्पत्ति का रक्षक है तो दूसरी ओर यही नाग अपने फन पर समस्त संसार को उठाये है। सांप को कुल व वन सम्पत्ति का रक्षक मानते हुए हर घर में उसके लिये स्थान सुरक्षित रहा है और नाग पंचमी का लोकप्रिय त्योहार इसका सबूत है।

पुराने जमाने में आदमी कितना सम्पन्न है इसके दो मापदण्ड होते थे कि इसके पास कितना अनाज है और कितना कपड़ा है। कपड़ा और अन्न सब से बड़ी सम्पत्ति थी। इस सम्पत्ति का विनाशक चूहा सदा से रहा है और सांप चूहे का जानी दुश्मन। अतः मनुष्य की सम्पत्ति को इस विनाशक जीव चूहे से सुरक्षित रखने के उपलक्ष में ही सर्प की धन रक्षक के रूप में पूजा जाता रहा होगा।

सर्प की कल्पना के साथ ही मनुष्य के मस्तिष्क में दो बिचार आते हैं [१] सांप उसके चमकते विषदंत और मोत [२] सांप और चूहा। चूहा एक छोटा सा जीव, मनुष्य जाति को उससे भला क्या खतरा हो सकता है, परन्तु सांप तो साक्षात् मृत्यु नजर आता है। यह और बात है परन्तु मैं सोचता हूँ कि सर्प आज भी देवता के समान मनुष्य जाति का रक्षक व सहायक सिद्ध हो सकता है।

सन् १८६८ से १९४८ तक के आँकड़े बताते हैं कि प्रति वर्ष २,४७,०१५ [दो लाख सैंतालीस हजार पन्द्रह] आदमी प्रत्यक्ष रूप से चूहे से उत्पन्न बीमारियों से मारा जाता रहा है और अप्रत्यक्ष रूप से चूहों द्वारा बरबाद किये गये अन्न की कमी से कितनी जाने गई होंगी इसका अनुमान कठिन है। विशेषज्ञों का कहना है कि सन् १९७३ में उत्पन्न विश्वव्यापी अन्नाभाव की पूर्ति केवल भारत में चूहों द्वारा नष्ट अन्न को बचा लेने से की जा सकती थी। सन् १९१६ में डा० कुडहर्ट ने बताया कि बीस वर्षों में चूहों द्वारा नष्ट सामग्री का अनुमान १,२४१ करोड़ रुपये का है।

चूहा ही नहीं मोटर को लीजिये और देखिये कि वह कितनी विनाशक और जान लेवा है। मोटर के आविष्कार से लेकर अब तक सड़क दुर्घटनाओं में मारे गये व्यक्तियों की संख्या अधिक है उन हताहतों की संख्या से जो प्रथम महायुद्ध से लेकर आज तक हुए समस्त सैन्यों द्वितीय महायुद्ध, अरब-इज़राइल, वियतनाम, हिन्द-पाक, हिन्द चीन आदि में मारे गये। इसके अतिरिक्त अप्रत्यक्ष रूप से कारों के घुएं से प्रतिवर्ष छोड़े गये बिलियन टन कार्बन डाइ आक्साइड व अन्य घातक गैसों से प्रदूषित वायुमण्डल से उत्पन्न बीमारियों की विभीषिका का अनुमान नहीं लगाया जा सकता।

इन दोनों की तुलना में सांप काटने से मरे व्यक्तियों की संख्या का अनुमान केवल १५,००० प्रतिवर्ष है जो मृत्यु दर का .००४१ प्रतिशत होता है।

आज स्थिति यह है कि मोटर इतनी खतरनाक होते हुए भी मनुष्य को प्यारी है। चूहा दौड़ता रहता है घरों में, खेत खलिहानों में, परन्तु वह तनिक भी घातक प्रतीत नहीं होता। विपरीत इसके सांप यदि एक भी दिलाई पड़ जाय तो मनुष्य तब तक चैन नहीं लेता जब तक वह उसे मार कर जला न डाले।

विदेशी मोहित हुए सांप की चिकीतीदार चमकीली खालों पर और ये खालें विदेशी बाजारों में ऊँचे दामों

पर बिकने लगीं। इस प्रकार करोड़ों साँप, गोयरे आदि रेंगने वाले जीवों की प्रतिवर्ष नियमित हत्याएं होती रहीं और उनकी खालें विदेशी सुन्दरियों के सौन्दर्य प्रसाधनों के रूप में विविध प्रकार से उनके तन पर सजती रही। धन के रक्षक नाग देवता को मारने से प्रत्यक्ष रूप में धन मिलने लगा तो इस होड़ में उसकी संख्या घटती ही चली गई। फलस्वरूप चूहों का उत्पात दिन प्रतिदिन जोर पकड़ने लगा। इस आपत्ति से बचने के लिये मनुष्य ने अपनी बुद्धिमत्ता का प्रयोग कर चूहों को जहर देकर मारने का अभियान चलाया। प्रारम्भ में इस अभियान की अदूरदर्शिता के कारण जहर से मरे चूहों को जिन्हें उठाने का कोई प्रबन्ध नहीं था चील, कबूतरे आदि परिन्दे खाने लगे। नतीजा यह हुआ कि इस जहरीले भोजन से ये परिन्दे मरने लगे और चूहों के दुश्मनों की संख्या घटती चली गई।

इधर मनुष्य ने अपने स्वार्थ के कारण जंगलों को काटा और वर्षा कम होने लगी। इस सूखे से चूहों के बिल व बच्चे अधिक सुरक्षित हो गये क्योंकि उनके बिलों में पानी भर जाने की प्रक्रिया में कमी आ गई। इस तरह से जहर से चूहा मारने का अभियान असफल रहा। वह चूहों की संख्या में कमी करने के बजाय कई नई समस्याओं का जन्मदाता हो गया।

इधर नाग देवता पर क्या बीती यह भी देखा जाए। भारत पर तब अंग्रेजी शासन था। साँप से भयभीत मनुष्य हर काल में रहा है। जंगलों की कटाई और जंगलों की ओर वस्तियों के बढ़ जाने से साँप अपनी सुरक्षा खोजता हुआ घरों में घुसने लगा। इससे अंग्रेजी शासन को यह भ्रमित आंकड़े और अनुमान मिला कि भारत में साँपों की संख्या व उत्पात बहुत बढ़ गया है। नतीजा यह हुआ कि अंग्रेजी हुकूमत ने एक सर्प-नाशक अभियान की योजना तैयार की और उसे हैदराबाद से प्रारम्भ किया। इस योजना के कार्यान्वयन से वैज्ञानिकों में खलबली मची। वैज्ञानिकों ने इस सर्प-नाशक अभियान का कड़ा विरोध किया और दलील दी कि साँप को मार देने से चूहों की संख्या बहुत अधिक हो जायगी जिससे इकोलोजिकल बेलेन्स बिगड़ेगा और भारी कठिनाइयों का सामना करना होगा। इस पर वह अभियान वापस ले लिया गया। सन १८७५ से १८७७ के मध्य रत्नागिरी में २७६५० साँपों के मारने के बदले में ८७७४-०० रुपया इनाम बांटा गया था।

कुछ प्रेक्षकों ने एक प्रयोग किया कि साँपों की एन्ट-रेन्डम हत्याएं कर उन्हें डिसेन्स किया और ज्यादातर साँपों के पेट में चूहों से कोई बड़ा खतरा नहीं है। इस प्रकार के अनेक विपरीत विचार इस विषय पर व्यक्त किये जा चुके हैं।

परन्तु मैं एक नवीन दृष्टिकोण से इस समस्या पर विचार करता रहा हूँ और जिस नतीजे पर पहुंचा हूँ उसे मैं विद्वानों, वैज्ञानिकों और सरकार के सामने रखना चाहूँगा।

मेरी मान्यता है कि जैसे उल्लू, बिल्ली, चील आदि भी चूहों के जानी दुश्मन होते हैं, परन्तु उनसे सुरक्षा पाने को चूहे दिन के समय बिलों में दुबक जाते हैं, और रात में अपने भोजन की तलाश में निकल पड़ते हैं। विपरीत इसके साँप का भय तो चाहे रात हो या दिन चूहे को लगा ही रहता है। साँप किसी भी समय उसके बिल में घुस जाने की सामर्थ्य रखता है। यही नहीं अगर सफल रहा तो वह चूहों को मार भगा कर उनके बिलों को अपना घर बना लेता है। साँप के इस भय से चूहा ग्राम तौर से भागता फिरता है और एक स्थान पर निश्चित होकर नहीं बैठ पाता जिससे उसकी प्रजनन शक्ति गम्भीर रूप से प्रभावित होती है। इस

प्रकार से चूहों की संख्या उचित सीमा में बंधी रहती है। अतः हमें यह धारणा रखनी चाहिए कि अपनी इस परिकल्पना के आधार में एक नवीन विचार वैज्ञानिकों, विद्वानों के सम्मुख रखना चाहता हूँ, यह जानते हुए कि मेरी बात हास्यास्पद होगी।

संसार भर में साँपों की २,५०० किस्में हैं। लगभग २१६ किस्में भारत में हैं जिनमें से केवल ५२ किस्म के साँप जहरीले हैं। भारत में ऐसे साँपों की जो जहरीले नहीं होते करीब १६४ किस्में मौजूद हैं। इन गैर जहरीले साँपों को सुरक्षित किया जा सकता है। एक ओर उनकी संख्या बढ़ा कर उससे कई प्रकार से लाभ लिये जा सकते हैं। एक ओर जहाँ चूहों के विनाश में इन्हें उपयोग किया जा सकता है, तो दूसरी ओर इन साँपों की संख्या में वृद्धि कर आवश्यकता से अधिक साँपों की खालों के व्यापार से विदेशी मुद्रा प्राप्त की जा सकती है। इसके अतिरिक्त साँप की चर्बी आदि का दवाओं में भी उपयोग किया जा सकता है।

पौराणिक कथाओं के अनुसार अभिमन्यु के बेटे परीक्षित के बारे में भविष्यवाणी थी कि वह साँप के काटने से मारा जायगा। अतः परीक्षित ने तय किया कि सर्पों का सर्वनाश कर दिया जाय ताकि वह अमर हो जाय। इसके लिये परीक्षित ने एक यज्ञ रचा जिसमें ऐसे मंत्रों का उच्चारण किया गया कि जिनके प्रभाव से संसार भर के सर्प खिंचे चले आये और यज्ञ की ज्वाला में स्वतः गिरने लगे। इस महाकाल से बच निकला एक सर्प परिवार शिवजी के पास पहुँच गया, शिवजी ने उस परिवार को शरण दे दी। परीक्षित शिव के पास पहुँचा और अपने यज्ञ के बारे में बताया मगर शिव ने अपनी शरण में आये सर्प परिवार को यज्ञ की ज्वाला में भस्म होने हेतु परीक्षित को साँपों से इंकार कर दिया। इसी वचे हुए सर्प परिवार से आज सर्प जाति संसार में कायम है।

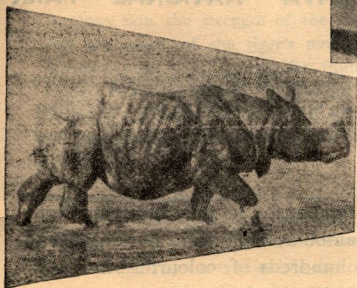
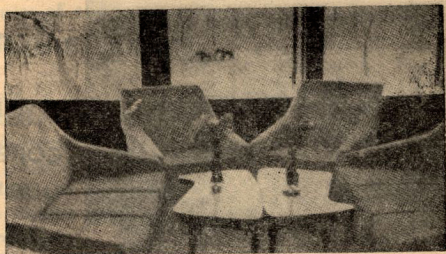
अतः मैं सोचता हूँ कि शिव द्वारा साँपों को शरण देने की बात इस युग में दोहराई जाय और सर्पपालन योजना बनाई जाकर जन हित में साँप को संरक्षण दिया जाय। इस प्रकार से नाग देवता को पूज्य मानने वाली भावना की पुनः स्थापना की जाय।

इस कार्य के निमित्त सर्वप्रथम कृषकों और अन्न-गोदामों के कर्मचारियों को जहरीले और गैर-जहरीले साँपों की पहचान के लिए प्रशिक्षण देना जरूरी है और साथ ही जनता को गैर-जहरीले साँपों से भयभीत न होने की शिक्षा देनी होगी। तत्पश्चात् सर्प पालन किया जा सकता है जो मानव जाति के लिये कल्याणकारी सिद्ध हो सकता है, इन गैर-जहरीले साँपों को अन्न गोदामों, जंगलों और खेत खलिहानों में छोड़ा जा सकता है ताकि मानव की विश्वव्यापी अवश्यसम्भावी सम्पत्ति को वे संरक्षण दे सकें।

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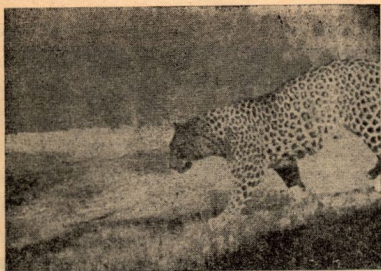
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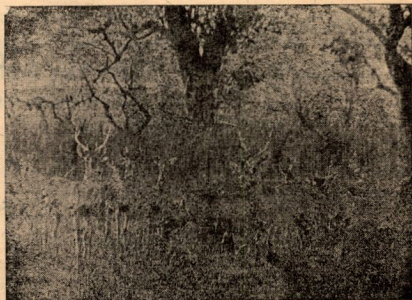
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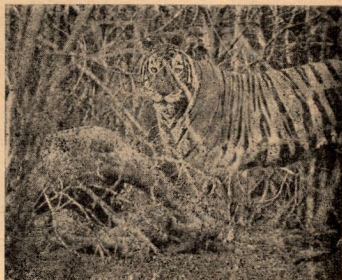


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